

SEQUENCE LISTING

<110> Allen, Steve
Kinney, Tony
Miao, Gou-Hua
Orozco, Buddy

<120> PLANT BIOTIN SYNTHASE

<130> BB1429 US NA

<140>

<141>

<150> 60/172929

<151> December 21, 1999

<160> 36

<170> Microsoft Office 97

<210> 1

<211> 512

<212> DNA

<213> Hordeum vulgare

<220>

<221> unsure

<222> (94)

<220>

<221> unsure

<222> (460)

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<221> unsure

<222> (462)

<400> 1

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<210> 2

<211> 137

<212> PRT

<213> Hordeum vulgare

<220>

<221> UNSURE

<222> (131)

BB1429:BB1429

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Phe Ala Ser Ala Val Ser Ala Ala Pro Phe Ser Ser Val Ser Ala Ala
20 25 30
Ala Ala Glu Ala Glu Arg Ala Val Arg Asp Gly Pro Arg Asn Asp Trp
35 40 45
Thr Arg Pro Glu Ile Gln Ala Ile Tyr Asp Ser Pro Leu Leu Asp Leu
50 55 60
Leu Phe His Gly Ala Gln Val His Arg Asn Val His Lys Phe Arg Glu
65 70 75 80
Val Gln Gln Cys Thr Leu Leu Ser Ile Lys Thr Gly Gly Cys Ser Glu
85 90 95
Asp Cys Ser Tyr Cys Pro Gln Ser Ser Arg Tyr Ser Thr Gly Leu Lys
100 105 110
Ala Glu Lys Leu Met Lys Lys Asp Ala Val Leu Glu Ala Ala Lys Lys
115 120 125
Ala Lys Xaa Ala Gly Ser Thr Arg Phe
130 135

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<211> 496
<212> DNA
<213> Zea mays

<220>
<221> unsure
<222> (33)

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gggttctcgt cggccgcggc ggaggcggag agggcgatac gggacgggac gcggaacgac 300
tggagccggc ccgagatnca ngccgtctac gactcaccgc tctcgcacct cctctttcac 360

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ggggntcagt catcaagata caacactgga ttgaagggcc aaaaattgat gaacaaatat 420
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<210> 4
<211> 102
<212> PRT
<213> Zea mays

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<220>
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<222> (48) .. (49)

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<400> 4
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Pro Leu Ala Ala Ala Ala Gly Phe Ser Ser Ala Ala Ala Glu Ala Glu
      20              25              30

Arg Ala Ile Arg Asp Gly Pro Arg Asn Asp Trp Ser Arg Pro Glu Xaa
      35              40              45

Xaa Ala Val Tyr Asp Ser Pro Leu Leu Asp Leu Leu Phe His Gly Xaa
      50              55              60

Gln Ser Ser Arg Tyr Asn Thr Gly Leu Lys Gly Gln Lys Leu Met Asn
      65              70              75              80

Lys Tyr Ala Val Leu Gly Ala Ala Lys Lys Xaa Lys Glu Ser Gly Lys
      85              90              95

Gln Pro Phe Leu His Gly
      100

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<210> 5
<211> 497
<212> DNA
<213> Zea mays

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<220>
<221> unsure
<222> (192)

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<220>
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 cgccgcccgc gngttctcgt cggccgcggc ggaggcggag agggcgatac gggacggggc 240
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 gcacacttct ttcaatcaag actggtggga tgcagtgaag attgttctta ctgtcctcaa 420
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 <212> PRT
 <213> Zea mays

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 <222> (23)

<220>
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 <221> UNSURE
 <222> (89)

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 Pro Leu Ala Ala Ala Ala Xaa Phe Ser Ser Ala Ala Ala Glu Ala Glu
 20 25 30
 Arg Ala Ile Arg Asp Gly Pro Arg Asn Asp Trp Ser Arg Pro Glu Ile
 35 40 45
 Gln Ala Val Tyr Asp Ser Pro Leu Leu Asp Leu Leu Phe His Gly Ala
 50 55 60
 Gln Val His Arg Asn Val His Xaa Ser Arg Glu Val Gln Gln Cys Thr
 65 70 75 80
 Leu Leu Ser Ile Lys Thr Gly Gly Xaa Ser Glu Asp Cys Ser Tyr Cys
 85 90 95
 Pro Gln

<210> 7
 <211> 1152

<212> DNA
<213> Zea mays

<400> 7
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cgactggagc cggcccgcga tccaggccgt ctacgactca ccgctcctcg acctcctctt 300
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atacaacact ggattgaagg cccaaaaatt gatgaacaaa tatgctgtct tggaagcagc 480
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cattggcagg aaatcaaact tcaaccagat tcttgaatat gtcaaggaaa taaggggtat 600
gggcatggag gtctgttgca cactaggcat gatagagaaa caacaagctg aagaactcaa 660
gaaggctgga cttacagcat ataatacata cctagatata tcaagagagt attatcccaa 720
cattattacc acaagatcat atgatgatag actgcagact cttgagcatg tccgtgaagc 780
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<210> 8
<211> 344
<212> PRT
<213> Zea mays

<400> 8
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Pro Leu Ala Ala Ala Ala Ala Phe Ser Ser Ala Ala Ala Glu Ala Glu
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Arg Ala Ile Arg Asp Gly Pro Arg Asn Asp Trp Ser Arg Pro Glu Ile
35 40 45
Gln Ala Val Tyr Asp Ser Pro Leu Leu Asp Leu Leu Phe His Gly Ala
50 55 60
Gln Val His Arg Asn Val His Lys Phe Arg Glu Val Gln Gln Cys Thr
65 70 75 80
Leu Leu Ser Ile Lys Thr Gly Gly Cys Ser Glu Asp Cys Ser Tyr Cys
85 90 95
Pro Gln Ser Ser Arg Tyr Asn Thr Gly Leu Lys Ala Gln Lys Leu Met
100 105 110
Asn Lys Tyr Ala Val Leu Glu Ala Ala Lys Lys Ala Lys Glu Ser Gly
115 120 125
Ser Thr Arg Phe Cys Met Gly Ala Ala Trp Arg Glu Thr Ile Gly Arg
130 135 140
Lys Ser Asn Phe Asn Gln Ile Leu Glu Tyr Val Lys Glu Ile Arg Gly
145 150 155 160

Met Gly Met Glu Val Cys Cys Thr Leu Gly Met Ile Glu Lys Gln Gln
165 170 175

Ala Glu Glu Leu Lys Lys Ala Gly Leu Thr Ala Tyr Asn His Asn Leu
180 185 190

Asp Thr Ser Arg Glu Tyr Tyr Pro Asn Ile Ile Thr Thr Arg Ser Tyr
195 200 205

Asp Asp Arg Leu Gln Thr Leu Glu His Val Arg Glu Ala Gly Ile Ser
210 215 220

Ile Cys Ser Gly Gly Ile Ile Gly Leu Gly Glu Ala Glu Glu Asp Arg
225 230 235 240

Val Gly Leu Leu His Thr Leu Ala Thr Leu Pro Thr His Pro Glu Ser
245 250 255

Val Pro Ile Asn Ala Leu Val Ala Val Lys Gly Thr Pro Leu Glu Asp
260 265 270

Gln Lys Pro Val Glu Ile Trp Glu Met Ile Arg Met Ile Ala Thr Ala
275 280 285

Arg Ile Thr Met Pro Lys Ala Met Val Arg Leu Ser Ala Gly Arg Val
290 295 300

Arg Phe Ser Met Pro Glu Gln Ala Leu Cys Phe Leu Ala Gly Ala Asn
305 310 315 320

Ser Ile Leu Ala Gly Glu Lys Leu Leu Thr Thr Ala Asn Asn Asp Phe
325 330 335

Asp Ala Asp Gln Ala Met Phe Lys
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<210> 9
<211> 562
<212> DNA
<213> Argemone mexicana

<220>
<221> unsure
<222> (553)

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gagagctcgt cttcgacctt tgattttcat ttctacattt tcttctctct catcatcttc 180
ttcttcttca gctgctgctg ttcaagcaga aagaacgatt aaagaaggtc caagaaacga 240
ttggagcaga gatgaaatta aatcgggtta tgattctcca gttctcgatc ttctcttcca 300
tgcagctcaa gtccatagac atgctcaciaa cttcagggaa gtgcagcaat gtactcttct 360
ctctgttaag acaggtgggt gcagtgaaaga ttgttcatat tgtccacaat cttccaggta 420
tgacactgga gtgaaagccc aaaagctgat gaacaaggga cgcagttctg caaggaagca 480
agaaaaggca aaggaggcgg ggtagtacac gttttcgcaa tgggtggctgc aatggggaga 540
tacaatgggg aangaagaac aa 562

<210> 10
<211> 119

<212> PRT
 <213> Argemone mexicana

<400> 10
 Met Leu Lys Val Gln Ser Leu Arg Ala Arg Leu Arg Pro Leu Ile Phe
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 Ile Ser Thr Phe Ser Ser Leu Ser Ser Ser Ser Ser Ser Ala Ala
 20 25 30
 Ala Val Gln Ala Glu Arg Thr Ile Lys Glu Gly Pro Arg Asn Asp Trp
 35 40 45
 Ser Arg Asp Glu Ile Lys Ser Val Tyr Asp Ser Pro Val Leu Asp Leu
 50 55 60
 Leu Phe His Ala Ala Gln Val His Arg His Ala His Asn Phe Arg Glu
 65 70 75 80
 Val Gln Gln Cys Thr Leu Leu Ser Val Lys Thr Gly Gly Cys Ser Glu
 85 90 95
 Asp Cys Ser Tyr Cys Pro Gln Ser Ser Arg Tyr Asp Thr Gly Val Lys
 100 105 110
 Ala Gln Lys Leu Met Asn Lys
 115

<210> 11
 <211> 1340
 <212> DNA
 <213> Glycine max

<400> 11
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 gttgttgtct gttgtctctg tcgtgtctat attcgcagat ctctcactca ttctctgttg 180
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 aagcagcttc ttctagttga 1340

<210> 12
 <211> 374

<212> PRT
 <213> Glycine max

<400> 12

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His	Ser	Ser	Tyr	Ala	Tyr	Ser	Ser	Ala	Ser	Ala	Ala	Ala	Ile	Gln	Ala
			20					25					30		
Glu	Arg	Ala	Ile	Lys	Glu	Gly	Pro	Arg	Asn	Asp	Trp	Ser	Arg	Asp	Gln
		35					40					45			
Val	Lys	Ser	Ile	Tyr	Asp	Ser	Pro	Ile	Leu	Asp	Leu	Leu	Phe	His	Gly
	50					55					60				
Ala	Gln	Val	His	Arg	His	Ala	His	Asn	Phe	Arg	Glu	Val	Gln	Gln	Cys
65					70					75					80
Thr	Leu	Leu	Ser	Ile	Lys	Thr	Gly	Gly	Cys	Ser	Glu	Asp	Cys	Ser	Tyr
				85					90					95	
Cys	Pro	Gln	Ser	Ser	Lys	Tyr	Asp	Thr	Gly	Val	Lys	Arg	Pro	Ser	Leu
			100					105					110		
Met	Asn	Lys	Glu	Ala	Val	Leu	Gln	Ala	Ala	Lys	Lys	Ala	Lys	Glu	Ala
		115					120					125			
Gly	Ser	Thr	Arg	Phe	Cys	Met	Gly	Ala	Ala	Trp	Arg	Asp	Thr	Leu	Gly
	130					135					140				
Arg	Lys	Thr	Asn	Phe	Asn	Gln	Ile	Leu	Glu	Tyr	Val	Lys	Asp	Ile	Arg
145					150					155					160
Asp	Met	Gly	Met	Glu	Val	Cys	Cys	Thr	Leu	Gly	Met	Leu	Glu	Lys	Gln
				165					170					175	
Gln	Ala	Val	Glu	Leu	Lys	Lys	Ala	Gly	Leu	Thr	Ala	Tyr	Asn	His	Asn
			180					185					190		
Leu	Asp	Thr	Ser	Arg	Glu	Tyr	Tyr	Pro	Asn	Ile	Ile	Thr	Thr	Arg	Thr
	195						200					205			
Tyr	Asp	Glu	Arg	Leu	Gln	Thr	Leu	Glu	Phe	Val	Arg	Asp	Ala	Gly	Ile
	210					215					220				
Asn	Val	Cys	Ser	Gly	Gly	Ile	Ile	Gly	Leu	Gly	Glu	Ala	Glu	Glu	Asp
225					230					235					240
Arg	Val	Gly	Leu	Leu	His	Thr	Leu	Ser	Thr	Leu	Pro	Thr	His	Pro	Glu
				245					250					255	
Ser	Val	Pro	Ile	Asn	Ala	Leu	Val	Ala	Val	Lys	Gly	Thr	Pro	Leu	Glu
			260					265					270		
Asp	Gln	Lys	Pro	Val	Glu	Ile	Trp	Glu	Met	Ile	Arg	Met	Ile	Ala	Thr
		275					280					285			
Ala	Arg	Ile	Val	Met	Pro	Lys	Ala	Met	Val	Arg	Leu	Ser	Ala	Gly	Arg
	290					295					300				

Val Arg Phe Ser Met Pro Glu Gln Ala Leu Cys Phe Leu Ala Gly Ala
305 310 315 320

Asn Ser Ile Phe Thr Gly Glu Lys Leu Leu Thr Thr Pro Asn Asn Asp
325 330 335

Phe Asp Ala Asp Gln Leu Met Phe Lys Val Leu Gly Leu Leu Pro Lys
340 345 350

Ala Pro Ser Leu His Glu Gly Glu Thr Ser Val Thr Glu Asp Tyr Lys
355 360 365

Glu Ala Ala Ser Ser Ser
370

<210> 13
<211> 479
<212> DNA
<213> Glycine max

<400> 13
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<210> 14
<211> 52
<212> PRT
<213> Glycine max

<400> 14
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Leu Met Glu Leu Cys Trp Gly Ala Gly Ser Leu His Arg Lys Phe His
20 25 30

Ile Pro Gly Ala Ile Gln Met Cys Thr Leu Leu Asn Ile Lys Thr Gly
35 40 45

Gly Cys Ser Glu
50

<210> 15
<211> 589
<212> DNA
<213> Triticum aestivum

<220>
<221> unsure
<222> (321)

<220>

<221> UNSURE

<222> (69)

<400> 16

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Arg Phe Cys Met Gly Ala Ala Trp Arg Glu Thr Ile Gly Arg Lys Thr
20 25 30

Asn Phe Asn Gln Ile Leu Glu Tyr Val Lys Asp Ile Arg Gly Met Gly
35 40 45

Met Glu Val Cys Cys Thr Leu Gly Met Leu Glu Lys Gln Gln Ala Glu
50 55 60

Glu Leu Gln Glu Xaa Asp Phe Thr Ala Tyr Asn His Asn Leu
65 70 75

<210> 17

<211> 1396

<212> DNA

<213> Hordeum vulgare

<400> 17

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<210> 18

<211> 405

<212> PRT

<213> Hordeum vulgare

<400> 18

Thr Thr Thr Pro Ser Ala Val Ser Pro Ser Ala Ala Ala Pro Phe
1 5 10 15

Ser Met Pro Glu Gln Ala Leu Cys Phe Leu Ala Gly Ala Asn Ser Ile
340 345 350

Phe Ala Gly Glu Lys Leu Leu Thr Thr Ala Asn Asn Asp Phe Asp Ala
355 360 365

Asp Gln Ala Met Phe Lys Ile Leu Gly Leu Ile Pro Lys Ala Pro Asn
370 375 380

Phe Gly Asp Glu Glu Ala Thr Val Ala Ser Ser Thr Glu Arg Cys Glu
385 390 395 400

Gln Ala Ala Ser Met
405

<210> 19
<211> 1467
<212> DNA
<213> Zea mays

<400> 19
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<210> 20
<211> 344
<212> PRT
<213> Zea mays

<400> 20
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Pro Leu Ala Ala Ala Ala Ala Phe Ser Ser Ala Ala Ala Glu Ala Glu
20 25 30

<210> 21
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 <212> DNA
 <213> Zea mays

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<210> 22
 <211> 377
 <212> PRT
 <213> Zea mays

<400> 22
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 Pro Leu Ala Ala Ala Ala Ala Phe Ser Ser Ala Ala Ala Glu Ala Glu
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 Arg Ala Ile Arg Asp Gly Pro Arg Asn Asp Trp Ser Arg Pro Glu Ile
 35 40 45
 Gln Ala Val Tyr Asp Ser Pro Leu Leu Asp Leu Leu Phe His Gly Ala
 50 55 60
 Gln Val His Arg Asn Val His Lys Phe Arg Glu Val Gln Gln Cys Thr
 65 70 75 80
 Leu Leu Ser Ile Lys Thr Gly Gly Cys Ser Glu Asp Cys Ser Tyr Cys
 85 90 95
 Pro Gln Ser Ser Arg Tyr Asn Thr Gly Leu Lys Ala Gln Lys Leu Met
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<210> 24
<211> 377
<212> PRT
<213> Zea mays

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<400> 24
Met Ala Leu Met Leu Leu Ala Arg Asn Leu Arg Ser Arg Leu Arg Pro
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Pro Leu Ala Ala Ala Ala Ala Phe Ser Ser Ala Ala Ala Glu Ala Glu
          20              25              30

Arg Ala Ile Arg Asp Gly Pro Arg Asn Asp Trp Ser Arg Pro Glu Ile
      35              40              45

Gln Ala Val Tyr Asp Ser Pro Leu Leu Asp Leu Leu Phe His Gly Ala
      50              55              60

Gln Val His Arg Asn Val His Lys Phe Arg Glu Val Gln Gln Cys Thr
      65              70              75              80

Leu Leu Ser Ile Lys Thr Gly Gly Cys Ser Glu Asp Cys Ser Tyr Cys
          85              90              95

Pro Gln Ser Ser Arg Tyr Asn Thr Gly Leu Lys Ala Gln Lys Leu Met
      100              105              110

Asn Lys Tyr Ala Val Leu Glu Ala Ala Lys Lys Ala Lys Glu Ser Gly
      115              120              125

Ser Thr Arg Phe Cys Met Gly Ala Ala Trp Arg Glu Thr Ile Gly Arg
      130              135              140

Lys Ser Asn Phe Asn Gln Ile Leu Glu Tyr Val Lys Glu Ile Arg Gly
      145              150              155              160

Met Gly Met Glu Val Cys Cys Thr Leu Gly Met Ile Glu Lys Gln Gln
          165              170              175

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<210> 26
 <211> 379
 <212> PRT
 <213> Argemone mexicana

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<400> 26
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Ile Ser Thr Phe Ser Ser Leu Ser Ser Ser Ser Ser Ser Ser Ala Ala
      20              25              30

Ala Val Gln Ala Glu Arg Thr Ile Lys Glu Gly Pro Arg Asn Asp Trp
      35              40              45

Ser Arg Asp Glu Ile Lys Ser Val Tyr Asp Ser Pro Val Leu Asp Leu
      50              55              60

Leu Phe His Ala Ala Gln Val His Arg His Ala His Asn Phe Arg Glu
      65              70              75              80

Val Gln Gln Cys Thr Leu Leu Ser Val Lys Thr Gly Gly Cys Ser Glu
      85              90              95

Asp Cys Ser Tyr Cys Pro Gln Ser Ser Arg Tyr Asp Thr Gly Val Lys
      100             105             110

Ala Gln Lys Leu Met Asn Lys Asp Ala Val Leu Gln Ala Ala Glu Lys
      115             120             125

Ala Lys Glu Ala Gly Ser Thr Arg Phe Cys Met Gly Ala Ala Trp Arg
      130             135             140

Asp Thr Val Gly Arg Lys Thr Asn Phe Lys Gln Ile Leu Glu Tyr Val
      145             150             155             160

Lys Glu Ile Arg Gly Met Gly Met Glu Val Cys Cys Thr Leu Gly Met
      165             170             175

Ile Glu Lys Gln Gln Ala Val Glu Leu Lys Gln Ala Gly Leu Thr Ala
      180             185             190

Tyr Asn His Asn Leu Asp Thr Ser Arg Glu Tyr Tyr Pro Asn Ile Ile
      195             200             205

Thr Thr Arg Ser Tyr Asp Glu Arg Leu Glu Thr Leu Gln Phe Val Arg
      210             215             220

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Ile Gly Leu Gly Glu Ala Glu Glu Asp Arg Val Gly Leu Leu His Thr
275 280 285

Leu Ser Thr Leu Pro Thr His Pro Glu Ser Val Pro Ile Asn Ala Leu
290 295 300

Val Ala Val Lys Gly Thr Pro Leu Glu Asp Gln Lys Pro Val Glu Ile
305 310 315 320

Trp Glu Met Ile Arg Met Ile Ala Thr Ala Arg Ile Val Met Pro Lys
325 330 335

Ala Met Val Arg Leu Ser Ala Gly Arg Val Arg Phe Ser Met Pro Glu
340 345 350

Gln Ala Leu Cys Phe Leu Ala Gly Ala Asn Ser Ile Phe Thr Gly Glu
355 360 365

Lys Leu Leu Thr Thr Pro Asn Asn Asp Phe Asp Ala Asp Gln Leu Met
370 375 380

Phe Lys Val Leu Gly Leu Leu Pro Lys Ala Pro Ser Leu His Glu Gly
385 390 395 400

Glu Thr Ser Val Thr Glu Asp Tyr Lys Glu Ala Ala Ser Ser Ser
405 410 415

<210> 29

<211> 1659

<212> DNA

<213> Glycine max

<400> 29

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 aaaaaaaaaa aaaaaaaaaa aaaaaaaaaa aaaaaaaaaa 1659

<210> 30
 <211> 417
 <212> PRT
 <213> Glycine max

<400> 30
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 20 25 30
 Val Gln Lys Ser Arg Asn Tyr Gly Thr Val Ser Ser Val Pro Pro Gln
 35 40 45
 Ala Thr Glu Thr Ser Ser Thr Ser Pro Ser Lys Asp Val Tyr Gln Glu
 50 55 60
 Ala Leu Asn Ala Thr Glu Pro Arg Ser Asn Trp Thr Arg Glu Glu Ile
 65 70 75 80
 Lys Ala Ile Tyr Asp Lys Pro Leu Met Glu Leu Cys Trp Gly Ala Gly
 85 90 95
 Ser Leu His Arg Lys Phe His Ile Pro Gly Ala Ile Gln Met Cys Thr
 100 105 110
 Leu Leu Asn Ile Lys Thr Gly Gly Cys Ser Glu Asp Cys Ser Tyr Cys
 115 120 125
 Ala Gln Ser Ser Arg Tyr Gln Thr Gly Leu Lys Ala Ser Lys Met Val
 130 135 140
 Ser Val Glu Ser Val Leu Ala Ala Ala Arg Ile Ala Lys Asp Asn Gly
 145 150 155 160
 Ser Thr Arg Phe Cys Met Gly Ala Ala Trp Arg Asp Met Arg Gly Arg
 165 170 175
 Lys Thr Asn Leu Lys Asn Val Lys Thr Met Val Ser Glu Ile Arg Gly
 180 185 190
 Met Gly Met Glu Val Cys Val Thr Leu Gly Met Ile Asp Ala Glu Gln
 195 200 205
 Ala Gln Glu Leu Lys Glu Ala Gly Leu Thr Ala Tyr Asn His Asn Val
 210 215 220
 Asp Thr Ser Arg Asp Phe Tyr Pro Lys Val Ile Thr Thr Arg Thr Tyr
 225 230 235 240
 Asp Glu Arg Leu Asp Thr Ile Lys Asn Val Arg Glu Ala Gly Ile Asn
 245 250 255
 Val Cys Thr Gly Gly Ile Leu Gly Leu Gly Glu Asn Lys Ser Asp His
 260 265 270

Ile Gly Leu Leu Glu Thr Val Ala Thr Leu Pro Ser His Pro Glu Ser
275 280 285

Phe Pro Val Asn Met Leu Val Ala Ile Lys Gly Thr Pro Leu Glu Gly
290 295 300

Asn Lys Lys Val Glu Phe Glu Asn Met Leu Arg Met Val Ala Thr Ala
305 310 315 320

Arg Ile Val Met Pro Lys Thr Ile Val Arg Leu Ala Ala Gly Arg Gly
325 330 335

Glu Leu Ser Glu Glu Gln Gln Val Leu Cys Phe Met Ala Gly Ala Asn
340 345 350

Ala Val Phe Thr Gly Glu Thr Met Leu Thr Thr Pro Ala Val Gly Trp
355 360 365

Gly Val Asp Ser Val Val Phe Asn Arg Trp Gly Leu Arg Pro Met Glu
370 375 380

Ser Phe Glu Val Glu Ala Leu Lys Asn Asp Lys Pro Ala Thr Thr Asn
385 390 395 400

Thr Glu Ile Pro Val Glu Ala Ser Lys Ala Glu Met Pro Gly Thr Val
405 410 415

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<210> 31
<211> 1032
<212> DNA
<213> Triticum aestivum

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aaaaaaaaaa aa 1032

<210> 32
<211> 263
<212> PRT
<213> Triticum aestivum

<400> 32

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Ser Thr Arg Phe Cys Met Gly Ala Ala Trp Arg Glu Thr Ile Gly Arg
20 25 30

Lys Thr Asn Phe Asn Gln Ile Leu Glu Tyr Val Lys Asp Ile Arg Gly
35 40 45

Met Gly Met Glu Val Cys Cys Thr Leu Gly Met Leu Glu Lys Gln Gln
50 55 60

Ala Glu Glu Leu Lys Lys Ala Gly Leu Thr Ala Tyr Asn His Asn Leu
65 70 75 80

Asp Thr Ser Arg Glu Tyr Tyr Pro Asn Ile Ile Ser Thr Arg Ser Tyr
85 90 95

Asp Asp Arg Leu Gln Thr Leu Gln His Val Arg Glu Ala Gly Ile Ser
100 105 110

Val Cys Ser Gly Gly Ile Ile Gly Leu Gly Glu Ala Glu Glu Asp Arg
115 120 125

Val Gly Leu Leu His Thr Leu Ala Thr Leu Pro Thr His Pro Glu Ser
130 135 140

Val Pro Ile Asn Ala Leu Ile Ala Val Lys Gly Thr Pro Leu Gln Asp
145 150 155 160

Gln Lys Pro Val Glu Ile Trp Glu Met Ile Arg Met Ile Ala Ser Ala
165 170 175

Arg Ile Val Met Pro Lys Ala Met Val Arg Leu Ser Ala Gly Arg Val
180 185 190

Arg Phe Ser Met Pro Glu Gln Ala Leu Cys Phe Leu Ala Gly Ala Asn
195 200 205

Ser Ile Phe Ala Gly Glu Lys Leu Leu Thr Thr Ala Asn Asn Asp Phe
210 215 220

Asp Ala Asp Gln Ala Met Phe Lys Ile Leu Gly Leu Ile Pro Lys Ala
225 230 235 240

Pro Asn Phe Gly Asp Glu Glu Val Met Val Ala Ala Pro Thr Glu Arg
245 250 255

Cys Glu Gln Ala Ala Leu Met
260

<210> 33

<211> 378

<212> PRT

<213> Arabidopsis thaliana

<400> 33

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 Ser Ala Glu Ala Glu Arg Thr Ile Arg Glu Gly Pro Arg Asn Asp Trp
 35 40 45
 Ser Arg Asp Glu Ile Lys Ser Val Tyr Asp Ser Pro Leu Leu Asp Leu
 50 55 60
 Leu Phe His Gly Ala Gln Val His Arg His Val His Asn Phe Arg Glu
 65 70 75 80
 Val Gln Gln Cys Thr Leu Leu Ser Ile Lys Thr Gly Gly Cys Ser Glu
 85 90 95
 Asp Cys Ser Tyr Cys Pro Gln Ser Ser Arg Tyr Ser Thr Gly Val Lys
 100 105 110
 Ala Gln Arg Leu Met Ser Lys Asp Ala Val Ile Asp Ala Ala Lys Lys
 115 120 125
 Ala Lys Glu Ala Gly Ser Thr Arg Phe Cys Met Gly Ala Ala Trp Arg
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 Asp Thr Ile Gly Arg Lys Thr Asn Phe Ser Gln Ile Leu Glu Tyr Ile
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 Lys Glu Ile Arg Gly Met Gly Met Glu Val Cys Cys Thr Leu Gly Met
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 Ile Glu Lys Gln Gln Ala Leu Glu Leu Lys Lys Ala Gly Leu Thr Ala
 180 185 190
 Tyr Asn His Asn Leu Asp Thr Ser Arg Glu Tyr Tyr Pro Asn Val Ile
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 Thr Thr Arg Ser Tyr Asp Asp Arg Leu Glu Thr Leu Ser His Val Arg
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 Asp Ala Gly Ile Asn Val Cys Ser Gly Gly Ile Ile Gly Leu Gly Glu
 225 230 235 240
 Ala Glu Glu Asp Arg Ile Gly Leu Leu His Thr Leu Ala Thr Leu Pro
 245 250 255
 Ser His Pro Glu Ser Val Pro Ile Asn Ala Leu Leu Ala Val Lys Gly
 260 265 270
 Thr Pro Leu Glu Asp Gln Lys Pro Val Glu Ile Trp Glu Met Ile Arg
 275 280 285
 Met Ile Gly Thr Ala Arg Ile Val Met Pro Lys Ala Met Val Arg Leu
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 Ser Ala Gly Arg Val Arg Phe Ser Met Ser Glu Gln Ala Leu Cys Phe
 305 310 315 320
 Leu Ala Gly Ala Asn Ser Ile Phe Thr Gly Glu Lys Leu Leu Thr Thr
 325 330 335

Pro Asn Asn Asp Phe Asp Ala Asp Gln Leu Met Phe Lys Thr Leu Gly
340 345 350

Leu Ile Pro Lys Pro Pro Ser Phe Ser Glu Asp Asp Ser Glu Ser Glu
355 360 365

Asn Cys Glu Lys Val Ala Ser Ala Ser His
370 375

<210> 34

<211> 363

<212> PRT

<213> Schizosaccharomyces pombe

<400> 34

Met Phe Thr Arg Thr Ile Arg Gln Gln Ile Arg Arg Ser Ser Ala Leu
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Ser Leu Val Arg Asn Asn Trp Thr Arg Glu Glu Ile Gln Lys Ile Tyr
20 25 30

Asp Thr Pro Leu Ile Asp Leu Ile Phe Arg Ala Ala Ser Ile His Arg
35 40 45

Lys Phe His Asp Pro Lys Lys Val Gln Gln Cys Thr Leu Leu Ser Ile
50 55 60

Lys Thr Gly Gly Cys Thr Glu Asp Cys Lys Tyr Cys Ala Gln Ser Ser
65 70 75 80

Arg Tyr Asn Thr Gly Val Lys Ala Thr Lys Leu Met Lys Ile Asp Glu
85 90 95

Val Leu Glu Lys Ala Lys Ile Ala Lys Ala Lys Gly Ser Thr Arg Phe
100 105 110

Cys Met Gly Ser Ala Trp Arg Asp Leu Asn Gly Arg Asn Arg Thr Phe
115 120 125

Lys Asn Ile Leu Glu Ile Ile Lys Glu Val Arg Ser Met Asp Met Glu
130 135 140

Val Cys Val Thr Leu Gly Met Leu Asn Glu Gln Gln Ala Lys Glu Leu
145 150 155 160

Lys Asp Ala Gly Leu Thr Ala Tyr Asn His Asn Leu Asp Thr Ser Arg
165 170 175

Glu Tyr Tyr Ser Lys Ile Ile Ser Thr Arg Thr Tyr Asp Glu Arg Leu
180 185 190

Asn Thr Ile Asp Asn Leu Arg Lys Ala Gly Leu Lys Val Cys Ser Gly
195 200 205

Gly Ile Leu Gly Leu Gly Glu Lys Lys His Asp Arg Val Gly Leu Ile
210 215 220

His Ser Leu Ala Thr Met Pro Thr His Pro Glu Ser Val Pro Phe Asn
225 230 235 240

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Ile	Gln	Glu	Met	Val	Thr	Lys	Val	Asn	Asp	Met	Gly	Leu	Glu	Thr	Cys	
				165					170					175		
Val	Thr	Leu	Gly	Met	Val	Asp	Gln	Asp	Gln	Ala	Lys	Gln	Leu	Lys	Asp	
			180					185					190			
Ala	Gly	Leu	Thr	Ala	Tyr	Asn	His	Asn	Ile	Asp	Thr	Ser	Arg	Glu	His	
		195					200					205				
Tyr	Ser	Lys	Val	Ile	Thr	Thr	Arg	Thr	Tyr	Asp	Asp	Arg	Leu	Gln	Thr	
	210					215					220					
Ile	Lys	Asn	Val	Gln	Glu	Ser	Gly	Ile	Lys	Ala	Cys	Thr	Gly	Gly	Ile	
225					230					235					240	
Leu	Gly	Leu	Gly	Glu	Ser	Glu	Asp	Asp	His	Ile	Gly	Phe	Ile	Tyr	Thr	
				245					250					255		
Leu	Ser	Asn	Met	Ser	Pro	His	Pro	Glu	Ser	Leu	Pro	Ile	Asn	Arg	Leu	
			260					265					270			
Val	Ala	Ile	Lys	Gly	Thr	Pro	Met	Ala	Glu	Glu	Leu	Ala	Asp	Pro	Lys	
		275					280					285				
Ser	Lys	Lys	Leu	Gln	Phe	Asp	Glu	Ile	Leu	Arg	Thr	Ile	Ala	Thr	Ala	
	290					295					300					
Arg	Ile	Val	Met	Pro	Lys	Ala	Ile	Ile	Arg	Leu	Ala	Ala	Gly	Arg	Tyr	
305					310					315					320	
Thr	Met	Lys	Glu	Thr	Glu	Gln	Phe	Val	Cys	Phe	Met	Ala	Gly	Cys	Asn	
				325					330					335		
Ser	Ile	Phe	Thr	Gly	Lys	Lys	Met	Leu	Thr	Thr	Met	Cys	Asn	Gly	Trp	
			340					345					350			
Asp	Glu	Asp	Lys	Ala	Met	Leu	Ala	Lys	Trp	Gly	Leu	Gln	Pro	Met	Glu	
		355					360					365				
Ala	Phe	Lys	Tyr	Asp	Arg	Ser										
	370					375										

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 Gly Xaa Cys Xaa Glu Asp Cys Xaa Tyr Cys Xaa Gln
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